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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/827,530	04/20/2004	Torbjorn Sandstrom	2674-000025/US	2964
7590 09/25/2007 HARNESS, DICKEY & PIERCE, P.L.C. P.O. Box 8910 Reston, VA 20195			EXAMINER WHITMORE, STACY	
			ART UNIT 2825	PAPER NUMBER
			MAIL DATE 09/25/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/827,530

Applicant(s)

SANDSTROM ET AL.

Examiner

Stacy A. Whitmore

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 July 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 and 11-13 is/are pending in the application.
- 4a) Of the above claim(s) 12 and 13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 12 and 13 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

FINAL ACTION

Claim Objections

1. Claim 1 is objected to because of the following informalities:

In claim 1, lines 4-5, the claim language "with pattern" needs grammatical correction. Appropriate correction is required.

2. Newly submitted claims 12-13 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: a method of compensating CD variations comprising at least the step of compensating the dose while patterning said workpiece by pro-actively equalizing for said estimated CD variations, which is not a required claim limitation of the original claims.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 12-13 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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3. Claims 1, 3-5, 7, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Borodovsky (US Patent 6,021,0090) in view of Krivokapic (US Patent 5,655,110).

4. As for the claims, Borodovsky discloses the invention substantially as claimed, including:

A method and A pattern generator apparatus for writing patterns on masks (with means for) to compensating for process variations when printing a pattern on a work piece, said method comprising:

(A measuring device for/ means for) determining a two-dimensional CD (critical dimension) distribution (profile) associated with said pattern printed on a first mask [col. 2, lines 55-67; col. 5, lines 3-5, 23-36; col. 6, lines 1-3, 29-39; col. 7, lines 13-51];

Generating a two-dimensional (dose) compensation file to equalize variations in said two-dimensional cd profile [col. 2, lines 55-67; col. 5, lines 3-5, 23-36; col. 6, lines 1-3, 29-39; col. 7, lines 13-51, Figs. 4A-4B and 9A-9B showing both critical dimension profiles and the dose compensation profiles, in which the dose compensation data is used to control the microlithography tool to make the CD profile more uniform];

Adjusting, in said mask pattern generator, the dose in accordance with said two-dimensional dose compensation file [Figs. 4A-4B and 9A-9B showing both critical dimension profiles and the dose compensation profiles, in which the dose compensation data is used to control the microlithography tool to make the CD profile more uniform; and also, col. 6, line 29 – col. 7, line 13, wherein the filter is used within the microlithography tool (the tool is a mask pattern generator) to utilize the dose compensation data of, for example, figs. 4A and 9A]; and

(a writing device for) patterning a mask using said two-dimensional (dose) compensation file [col. 7, lines 36-41; Figs. 4A-4B and 9A-9B showing both critical dimension profiles and the dose compensation profiles, in which the dose compensation data is used to control the microlithography tool to make the CD profile more uniform; and also, col. 6, line 29 – col. 7, line 13, wherein the filter is used within the

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microlithography tool (the tool is a mask pattern generator) to utilize the dose compensation data of, for example, figs. 4A and 9A];

Measuring the two-dimensional profile [col. 2, line 55 – col. 3, line 13 show that the CD data is obtained by doing a physical optical process];

Pattern data [col. 7, lines 13-51];

Dose compensation data [col. 2, lines 55-67; col. 5, lines 3-5, 23-36; col. 6, lines 1-3, 29-39; col. 7, lines 13-51];

Borodovsky does not specifically disclose patterning a second mask according to the adjustment.

Krivokapic discloses patterning a second mask according to an adjustment of critical dimensions col. 7, lines 34-39; col. 8, lines 1-9].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Borodovsky and Krivokapic because utilizing adjustments or corrections of CD variation using a dose compensation would have allowed for Borodovsky's system to utilize corrections for subsequent masks with similar patterns to be corrected before being manufactured [see Borodovsky, col. 7, lines 8-13].

5. Claims 2 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Borodovsky (US Patent 6,021,0090) in view Krivokapic (US Patent 5,655,110), and further in view of Chilese (US Patent 6,424,879).

6. As for the claims, Borodovsky in view of Krivokapic discloses the invention substantially as claimed, including the method and apparatus for compensating for process variations when printing a pattern on a work piece (see as cited above in the rejections of claims 1, 3-5, and 7-10).

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Borodovsky does not specifically disclose

Predicting the two-dimensional CD distribution (profile); and
Correction map.

Chilese discloses Predicting the profile [col. 1, lines 45-50, 65-67; col. 2, lines 1-30; col. 5, lines 1-17, 53-67; col. 6, lines 5-20; col. 7, lines 64-67; col. 8, lines 14-44 - the distortion maps are predictive]; and Correction maps [col. 1, lines 45-50, 65-67; col. 2, lines 1-30; col. 5, lines 1-17, 53-67; col. 6, lines 5-20; col. 7, lines 64-67; col. 8, lines 14-44 - the distortion maps are predictive].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Borodovsky in view of Krivokapic and Chilese because both predicting the 2D distribution (profile) and utilizing a correction map would have allowed Borodovsky in view of Krivokapic's system to provide predictive descriptions (maps) of the surface of the substrate and patterns printed on the surface, therefore enabling Borodovsky to utilize computer implemented techniques in order to speed or improve the correction process [see Chilese, col. 7, line 64 – col. 8, line 44].

7. Applicant's arguments filed July 2, 2007, with respect to claims 1-7, and 11 have been fully considered but they are not persuasive.

Applicant argues in substance:

A: Borodovsky does not generate a "two-dimensional dose compensation file," and adjust, "in said mask pattern generator, the dose in accordance with said two-dimensional dose compensation file," as required by claim 1. Moreover, Borodovsky is silent with regard to, "determining a two-dimensional critical dimension (CD) distribution associated with pattern printed on a first mask

B: Borodovsky does not disclose patterning a second mask using said adjustment of the dose in said mask pattern generator, as also required by claim 1.

Examiner respectfully disagrees for the following reasons:

With respect to A: Borodovsky does generate a "two-dimensional dose compensation file," and adjust, "in said mask pattern generator, the dose in accordance with said two-dimensional dose compensation file," as required by claim 1. Moreover, Borodovsky is silent with regard to, "determining a two-dimensional critical dimension (CD) distribution associated with pattern printed on a first mask [Figs. 4A-4B and 9A-9B showing both critical dimension profiles and the dose compensation profiles, in which the dose compensation data is used to control the microlithography tool to make the CD profile more uniform; Figs. 4A-4B and 9A-9B showing both critical dimension profiles and the dose compensation profiles, in which the dose compensation data is used to control the microlithography tool to make the CD profile more uniform; and also, col. 6, line 29 – col. 7, line 13, wherein the filter is used within the microlithography tool (the tool is a mask pattern generator) to utilize the dose compensation data of, for example, figs. 4A and 9A; Figs. 4A-4B and 9A-9B showing both critical dimension profiles and the dose compensation profiles, in which the dose compensation data is used to control the microlithography tool to make the CD profile more uniform; and also, col. 6, line 29 – col. 7, line 13, wherein the filter is used within the microlithography tool (the tool is a mask pattern generator) to utilize the dose compensation data of, for example, figs. 4A and 9A].

With Respect to B: The argument that Borodovsky, as used in the prior office action, does not disclose patterning a second mask using said adjustment of the dose in said mask pattern generator, as also required by claim 1, is irrelevant because a new rejection has been made of record.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stacy A. Whitmore whose telephone number is (571) 272-1685. The examiner can normally be reached on Monday-Thursday, alternate Friday 6:30am - 4:00 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Chiang can be reached on (571) 272-7483. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Stacy A Whitmore/

Primary Examiner

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SAW

January 21, 2007